

1052-05-13

Glenn Appleby* (gappleby@scu.edu), Department of Mathematics and CS, Santa Clara University, Santa Clara, CA 95053, and **Tamsen Whitehead**. *Symmetries of Hives, Generalized Littlewood-Richardson Fillings, and Invariants of Matrix Pairs over Valuation Rings*. Preliminary report.

Work by Pak and Vallejo found linear bijections between Littlewood-Richardson fillings (LR fillings) of skew shapes and certain integer-valued hives. Hives are defined over \mathbb{R} , so these maps allow one to define “real-valued” LR fillings, though it’s not clear that such fillings correspond to objects of interest. Our recent results supply one such interpretation, and show how to realize \mathbb{R} -valued LR fillings as invariants of pairs of full-rank matrices over rings with an \mathbb{R} -valuation (generalizing previous results with integer-valued LR fillings and matrices over discrete valuation rings), so that we have bijections between hives, matrix pairs, and generalized LR fillings. The S_3 triangle symmetries of hives now correspond to alternate algebraic representations of one matrix pair, and also define new linear bijections between six related families of LR fillings. Further, the involution LR fillings proving $c_{\mu\nu}^\lambda = c_{\nu\mu}^\lambda$ has been extended to give a new involution on hives. Lastly, natural matrix operations are interpreted in the hive and LR filling context to define infinite families of such objects with a common “combinatorial core.” (Received April 27, 2009)